



Designing for ENERGY STAR® — EPA's Experiences

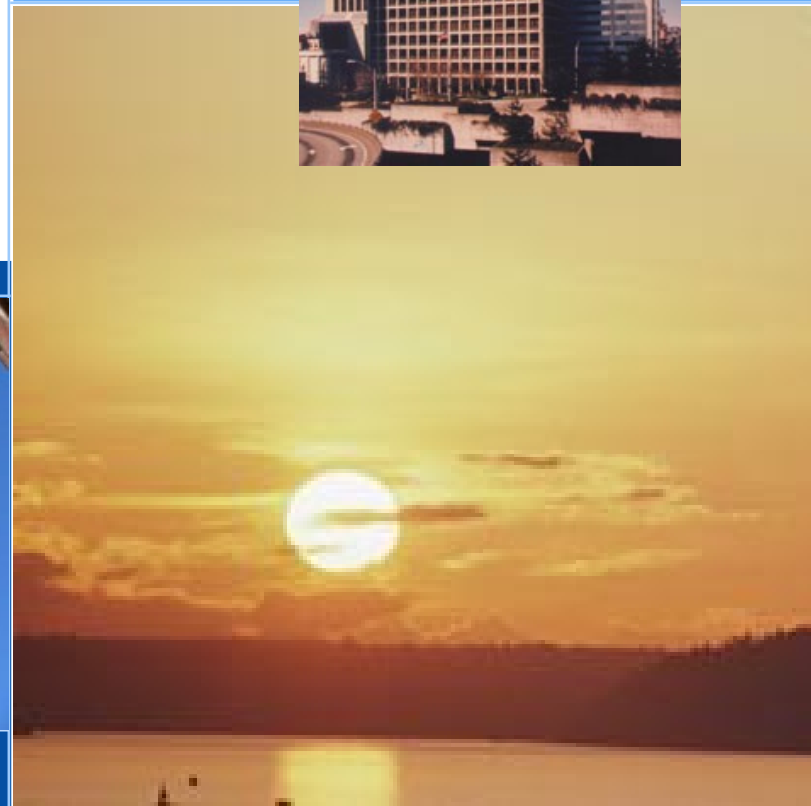
Energy Efficiency in Government Buildings Retrofit Workshop

Department of Defense (DOD), International Energy
Agency (IEA): Energy Conservation in Buildings and
Community Systems (ECBCS)

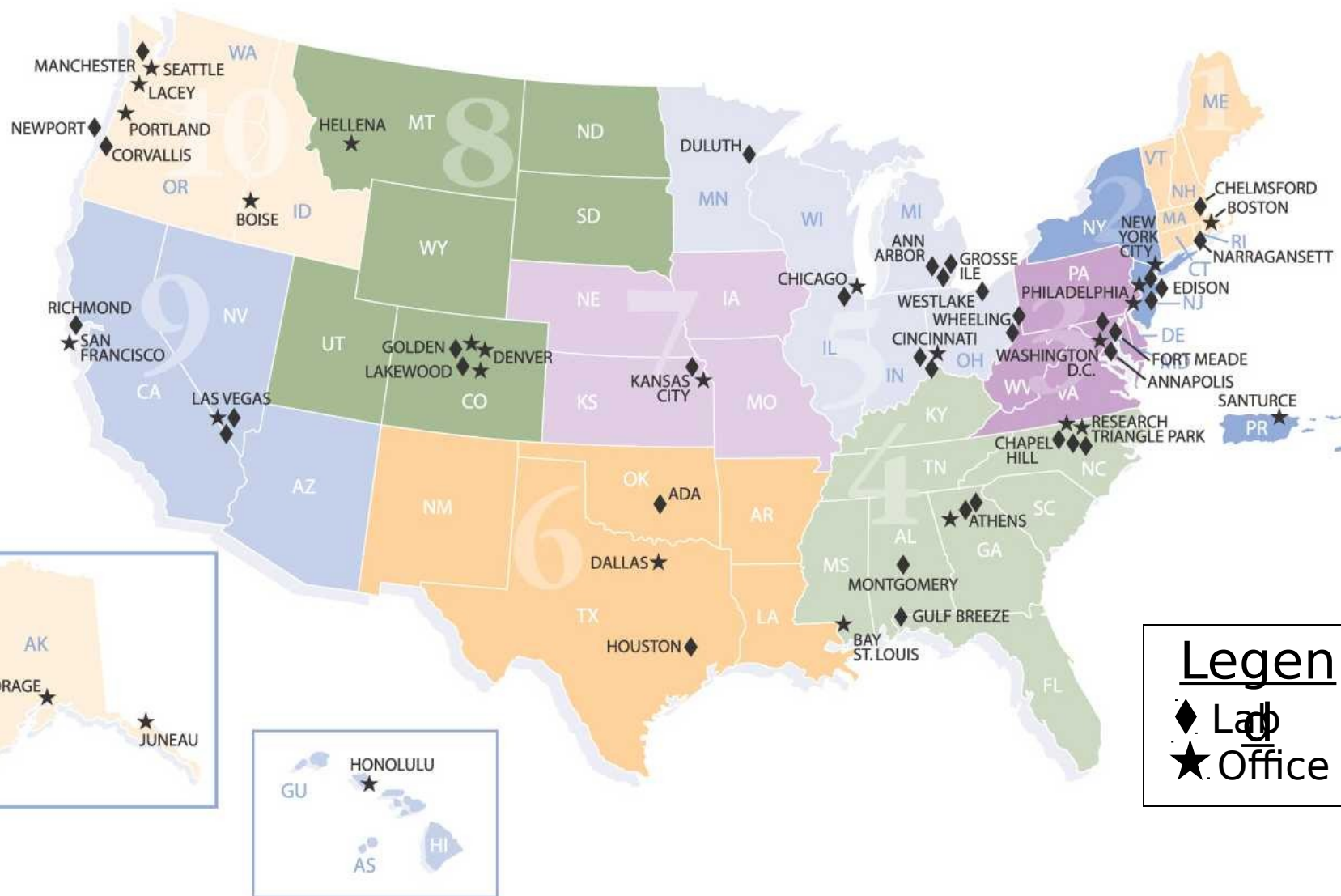
Organized by the U.S. Army Research and Development
Center (ERDC)



Dan Amon
U.S. EPA
February 5,
2005



EPA Facilities



EPA's Energy Use and Cost

FY 2004 Reportable Energy Use

(Laboratories only, where EPA pays utilities)

- 1.3 million Btus total
- \$16.4 million total cost
- 355,773 Btus/square foot (296,877 with green power netted out)
- \$4.46 per square foot

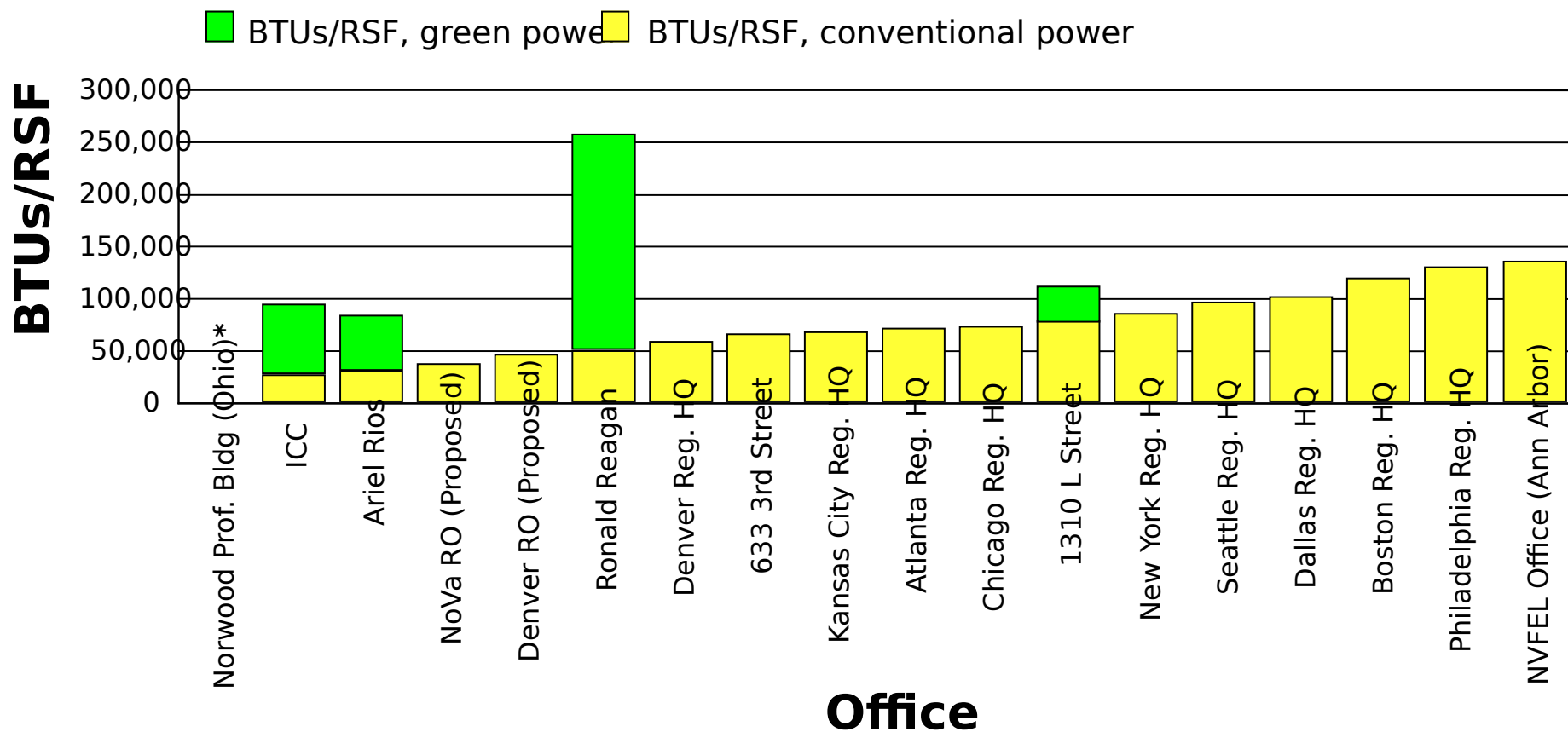
FY 2004 Office Energy Use

(GSA reports; missing data for 4-5 significant buildings)

- 447 billion Btus
- \$9.4 million total cost
- 79,759 Btus/square foot
- \$1.68 per square foot

FY 2004 Annual Energy Use in BTUs/RSF

(For EPA Offices Larger Than 20,000 RSF)



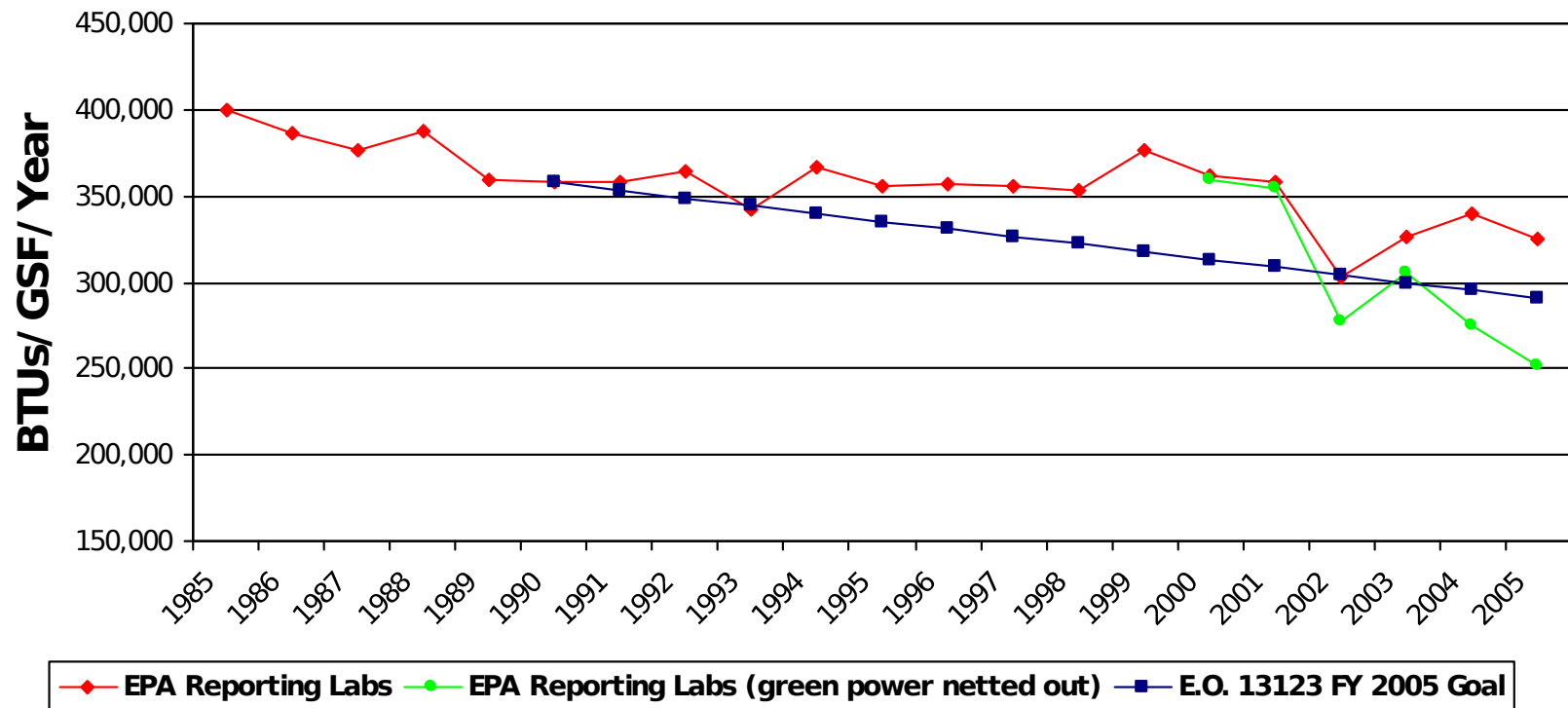
*Note: Norwood Prof. Building consumed 2,518 BTUs/RSF during FY04.

EPA's Sustainable Facilities Practices Branch

- Focused on energy efficiency, green power, water conservation, green buildings and other sustainable practices at EPA facilities
- Executive Order 13123—requires federal agencies to reduce reportable energy use 20 percent by 2005 and 25 percent by 2010 (from 1990 baseline)
- Use green power or renewable energy certificates for 75 percent of the Agency's electricity use)
- Mechanical upgrades, commissioning, re/retro-commissioning for existing buildings
- Ensure new buildings designed for energy efficiency

Commissioning Drivers

1. Reliability
2. Utility costs
3. LEED™
4. Quality Control



EPA's ENERGY STAR® Program

- Voluntary government/industry partnership designed to identify and promote energy-efficient products to reduce greenhouse gas emissions
- Offers businesses and consumers energy-efficient solutions to help save money while protecting the environment
- Labeling program for more than 40 product categories
- Building label for facilities that perform in the top 25 percent of their category
- ENERGY STAR® saves businesses, organizations, and consumers more than \$8 billion/year

Target Finder

Internet-based tool that helps users manage energy during the design of a new building, including:

- Determining an annual energy target for your building design
- Comparing energy use from simulations with your target
- Monitoring a design's energy performance as building plans progress
- Evaluating the cost-effectiveness of energy efficiency measures
- Minimizing potential greenhouse gas emissions associated with your building design

Solicitation for Offer (SFO)

New EPA building SFOs require:

- Commissioning
 - Agent contracted to developer/owner
 - Independent commissioning agent to evaluate building from design through occupancy
- LEED™ Silver certification
- ENERGY STAR® compliance (i.e., rating of 75 or higher on the Energy Star benchmarking tool)
- 30 percent better than ASHRAE 90.1(1999) standard for energy performance

Denver, CO



- New 250,000 sq. foot Region 8 office, 10-year lease
- EPA and GSA evaluated development teams' proposals on environmental performance, along with other criteria
- LEED Silver required, contractor has promised Gold
- ENERGY STAR label required within 14 months of 95 percent occupancy
- Low-flow plumbing and water-conserving mechanical systems will maximize water conservation

Potomac Yard, VA



- New 422,000 sq. foot office, 10-year lease in Arlington, VA
- Occupancy expected in 2006
- LEED Silver required and may get higher
- ENERGY STAR label required within 14 months of 95 percent occupancy
 - Currently benchmarking at about 85 on Target Finder

Boston, MA

- Renovation and rehabilitation of two federal buildings (225,000 sq. feet) with EPA Region 1 as largest tenant
- LEED Silver required
- Currently projected at 69,000 BTU's/GSF
- “Green roof” will help control stormwater runoff and reduce urban heat island effect



Atlanta, GA

- Recommissioning project to reduce energy use at Sam Nunn Atlanta Federal Center
- Recently received ENERGY STAR label
- Energy reduction measures have already saved almost 22 billion Btus annually



ENERGY STAR Buildings

- Region 4 Atlanta Federal Center expected this spring
- Region 10 in Seattle received ENERGY STAR label in October 2004
- Current Region 8 office in Denver renewed ENERGY STAR label in 2004
- Region 5 Metcalfe Federal Building received label in 1999
- Region 2 Foley Square Building received label in 1999

Fort Meade, MD

Environmental Science Center opened in February, 1999



- Re-commissioning included:
 - Revising airflow maximums and airflow maximums and minimums
 - Turning off unneeded equipment
 - Adjusting supply temperatures
 - Adjusting sequences of operation
 - Revising lighting operations
- Results:
 - Immediate 15% energy decrease
 - 20% reduction in unoccupied maximum air flows
 - 40% reduction in unoccupied minimum air flows
 - Running 2 air handling units (AHUs) versus 4 during occupied

RTP, NC



Current efforts include:

- Commissioning laboratory fume hood systems
 - Including air handling units, exhaust fans, VAV controls and building automation system
- Commissioning office VAV systems
 - Including air handling units, VAV controls, and building automation system
- Commissioning building automation system
- Anticipated savings from re-commissioning laboratory systems
 - 10-20% of total utility billing = \$600K up to \$1.2 million/year
 - Investment equals a one-to-two year simple payback for the process

Ada, OK



ESPC Project

- Contractor commissioning effort = 4 days
- EPA's commissioning effort = 6 weeks
 - Included a complete commissioning of all building systems, including fume hood testing